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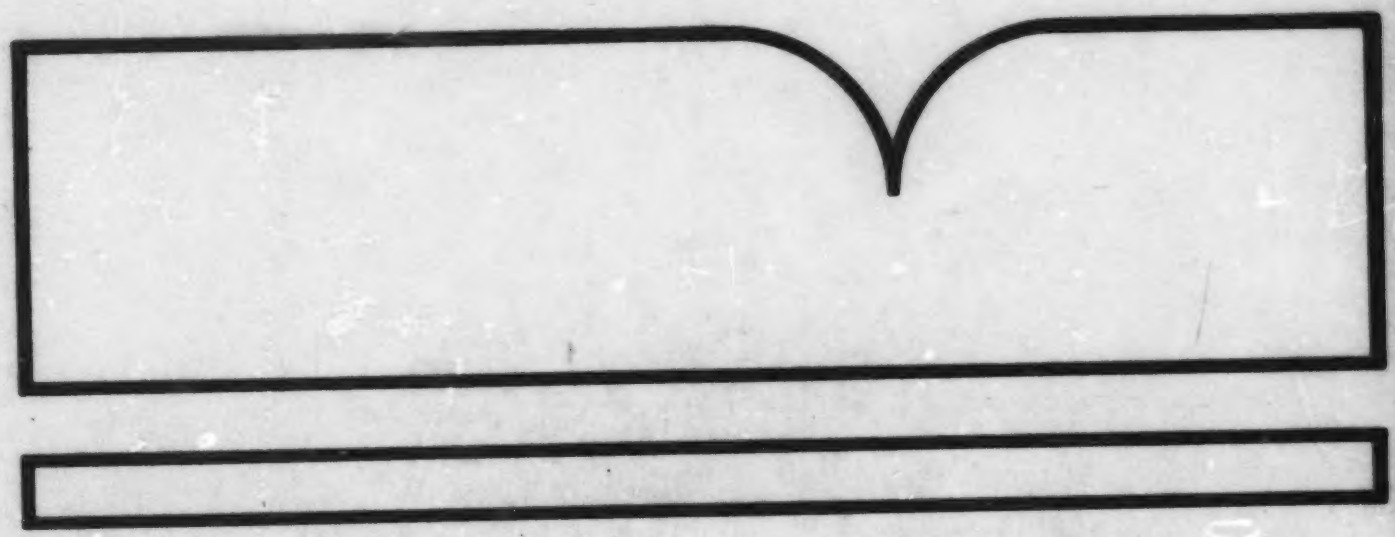
Generic Facilities Plan for a Small Community Stabilization Pond and Oxidation Ditch

(U.S.) Environmental Protection Agency
Washington, DC

Feb 81



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Generic Facilities Plan for a Small Community:

Stabilization Pond and Oxidation Ditch

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GENERIC FACILITIES PLAN

for a

SMALL COMMUNITY:

STABILIZATION POND AND OXIDATION DITCH

Project Officers

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February 1981

U.S. Environmental Protection Agency
Facility Requirements Division
Office of Water Program Operations
Washington, D.C. 20460

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INTRODUCTION AND USER GUIDE

The wastewater treatment problems and facilities planning issues of small communities and rural areas are different from those of large cities or more populated areas. Although different in level of complexity and in environmental and social impact, the problems are no less serious. EPA has developed an approach that recognizes these differences and the nature of small community participation in the construction grants program. This document is one of the tools for use by small communities. It contains a generic facilities plan and a procedure to identify communities with the potential for using the generic facilities plan.

Need and Purpose of Generic Facilities Plans

EPA has observed that facilities planning for small communities and rural areas will frequently select one of two solutions as the most cost-effective. If alternative solutions such as land treatment or on-site disposal are not feasible, grantees usually select a solution featuring either a stabilization pond or an oxidation ditch. EPA research also demonstrates that these two solutions are usually preferable in terms of cost-effectiveness and performance potential.

EPA has also observed that like other grantees, small communities can be involved in facilities planning for 2-4 years before reaching a final solution. But these communities rarely have full time administrative staff, experience with the regulations and practices of the construction grants program or experience with the technical engineering or environmental issues likely to arise in a project. The preparation and completion of a facilities plan becomes a significant burden to these grantees and a real deterrent to solving the pollution problem.

Given adequate safeguards to ensure the appropriate consideration of the costs and environmental benefits of alternatives, directing grantees to the most likely solution makes sense in terms of saving time and costs in facilities planning. The generic plan is a simple, brief, easy to use guide that provides formats and suggestions for presenting basic data and justifying the use of either a stabilization pond or oxidation ditch with some allowance for consideration of on-site systems.

Some of the advantages to the State of using a generic plan include:

1.) Minimize the volume of plans to be reviewed;
2.) Improve plant performance through promotion of solutions that are simple to operate and maintain;
3.) Maximize the use of limited staff resources in other more complex plans through front-end involvement in this process.

Some of the advantages to the grantee include:

1.) A shorter and less complicated facilities planning process;
2.) Selection of a low cost, easy-to-operate facility;
3.) Priority and attention from state and EPA;
4.) Reducing questions and delays during State and EPA reviews.

Who, How and When to Decide on a Generic Facilities Plan

The decision on whether to use a generic facilities plan must be made with the participation and cooperation of EPA, the State, the grantee and its consultant. At various points in the process one or another of these actors will have a more dominant role, but all concerned should be fully informed and have an opportunity to participate. As the construction grants program is increasingly delegated to States for management, the State rather than EPA will have a lead role. Figure 1 shows the decision process for generic facilities planning from initial consideration of the option to plan completion.

1. Project Priority List Development

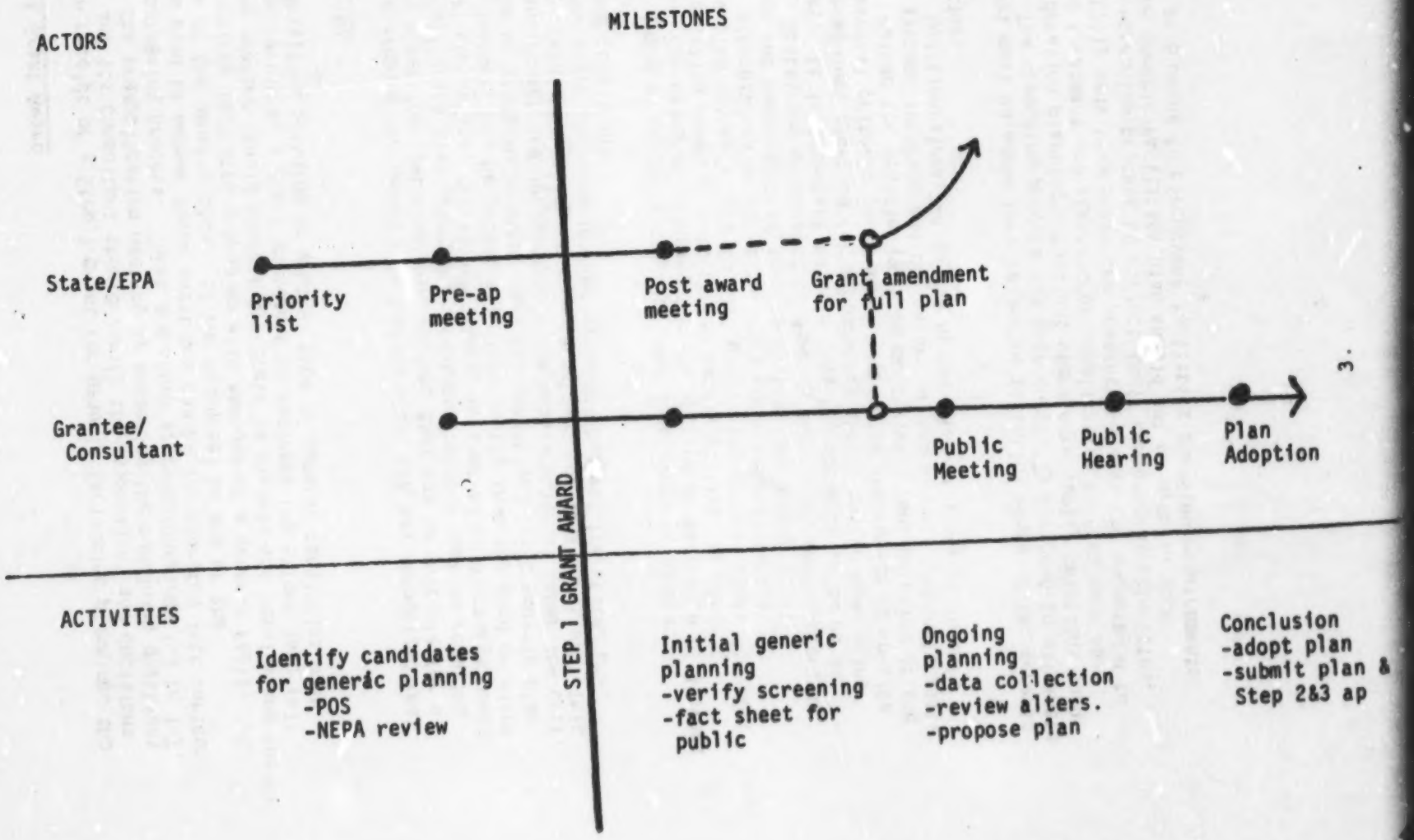
During the development of the project priority list, the State should identify those projects that are candidates for use of a generic facilities plan. This can be accomplished by completing the questions in Table A. Positive answers to all questions will indicate that a grant for one of four types of generic facilities plans should be offered. Two of the four types (stabilization pond and oxidation ditch) are presently available; on-site management and land treatment plans are still under development.

The State is encouraged to include both Step 1 (Generic Plans) and Step 2+3 projects for small communities on its priority list for the same year so that a project can move quickly into Step 2 design after completion of the brief generic facilities planning process.

2. Preapplication Conference

Prior to the preapplication conference, the State will notify the grantee of its intention to offer a grant for a generic facilities plan. At the preapplication conference, the State should discuss with the grantee the responses to Table A and other reasons for proposing use of a generic facilities plan. The grantee may provide data or other documentation showing why a generic plan approach may or may not be appropriate. If all parties agree, the results of this joint consultation will be the submission of a Plan of Study and an award for Step 1 grant for a generic facilities plan. The State should also discuss with the grantee those aspects of generic facilities planning and particular treatment options that will influence consultant selection.

FIGURE 1: GENERIC FACILITIES PLANNING PROCESS



3. Post Grant Award

Upon receipt of a Step 1 grant for generic facilities planning, the grantee and its consultant should verify the assumptions and decisions made at the preapplication meeting by answering the remaining questions of the screening process. These are shown as Questionnaires 1-1 to 1-7. The data used to answer these questions can be incorporated into various sections of the generic plan. If the responses to any of the questionnaires indicates a problem with the use of a generic facilities plan, the grantee should contact the State to discuss the results and the option of receiving a grant amendment to redirect the effort into full scale facilities planning or another type of generic facilities plan.

Flexibility

In developing the generic facilities plan, EPA has recognized that there are other low cost treatment options that may be suitable for a generic facilities plan approach. Treatment options such as rotating biological contactors, trickling filters, or controlled discharge ponds (aerated lagoons) may be potentially less costly than the pond or ditch option due to climatic or other physical conditions. The generic plan concept and format are designed to allow substitution of other low cost, simple to operate technologies as alternatives for consideration. This can be done after consultation and agreement between the State, EPA, grantee and consultant.

Other types of projects may also lend themselves to generic solutions. For example, planning for the upgrade or expansion of systems that use existing ponds or ditches can easily utilize the generic facilities plan concept. EPA is also developing generic plans for land treatment alternatives or for situations where rehabilitation, maintenance and management of on-site systems are appropriate. Similarly, States are encouraged to develop their own generic plans in these areas. It is important to note that the decision to adopt an on-site management approach for a community should not be made using strict numerical criteria (e.g. 5% of households are served by on-site systems). Rather the decision must be made with a consideration of the number of systems involved and the nature of the overall community waste disposal. Questionnaires 1-4 to 1-6 of the plan will assist in this determination.

A caveat must be added here regarding potential abuse of the generic approach. The screening process has been carefully designed to eliminate from consideration planning situations where more costly solutions such as advanced treatment are required or complicating factors such as environmentally sensitive areas are present. States are encouraged to adjust the screening process to reflect their own program priorities, however, the generic facilities plan should not be used in such situations as a means to circumvent facilities planning requirements.

The goals of the generic plan approach are to make the facilities planning process as simple and as flexible as possible for those situations in which the problem is easily identified and simply solved. An attitude of openness, flexibility and cooperation between all actors is required to achieve these aims.

Organization of Document

The remainder of this document presents material relevant to doing a generic facilities plan. Part I presents the preliminary screening questions that the State must answer affirmatively prior to making a final decision on a generic plan. Part II presents the generic facilities plan including the initial questions that must be answered to provide data to complete facilities planning. The complete text of the generic facilities plans is presented with all the tables and proposed formats placed at the end. This is intended to make reading of the plan easier and to emphasize its brevity.

PART I

STATE SCREENING PROCESS

The State should first review the preliminary screening questions (Table A) and adjust them as appropriate for situations particularly characteristic to its projects. If, for example, 90% of its communities have a population of less than 10,000 and a growth rate of 30% will represent a significant disruption, the State may want to adjust the population or growth rate criteria downward. Or if there are significant coastal areas whose protection is an identified high priority to the State, the State may choose to exclude all communities in such areas from consideration of the generic facilities plan option. These adjustments to the screening questions should be made prior to consideration of any specific community as eligible and after consultation (and approval if in an undelegated State) by EPA.

Upon final approval by EPA of the screening process, the State should proceed to use it in evaluating all potential Step 1 grant recipients in the upcoming fiscal year for eligibility for a generic plan. If a community meets all of the criteria set by the State, the State should indicate its intent to offer a grant for a generic facilities plan in its notification of a preapplication or post award conference.

Table A

State Screening Questions
for Selection of Generic Facilities Plan Candidates

1. Population Criteria

   a. Current population is less than 10,000
   b. Projected population growth is less than 30% of current population
   c. Industrial flow and organic loading must always be less than the domestic flow and organic loading

2. Proposed effluent limits do not require advanced treatment.

3. Any other criteria that the State finds appropriate, e.g. presence of environmentally sensitive areas, or other physical conditions that would preclude the use of available generic facilities plan options.

PART II

GENERIC FACILITIES PLAN

STABILIZATION POND OR OXIDATION DITCH

SECTION 1

PRELIMINARY SCREENING

1.0 The generic facilities planning process is based upon preliminary screening to ensure the appropriate use of the generic technology options for a given small community. If possible, the preliminary screening should be completed at a preapplication conference with input from the State, grantee and its consultant. However, lack of available data on critical areas or the inability of the grantee to hire a consultant may require that the preliminary screening be completed after a grant award has been made.

Questionnaires 1-1 through 1-7 (and associated worksheets and figures) are designed to aid the State and the grantee in making appropriate decisions regarding generic facilities planning. The screening process should be completed during the first phases of the facilities planning and provide data for first public meeting (see Section 8, Public Participation and Table 8-1).

Questionnaire 1-1

1. EPA/State approved current facilities planning population estimates for the planning area must be less than 10,000.

2. EPA/State approved projected population growth over the next 20 years (including non-residential growth) must be less than 30 percent of the current population. Non-residential growth must be considered in terms of population equivalents.

3. Industrial dischargers are not and will not be a problem. The generic plans are only applicable to municipalities in which the industrial flow and organic loading is less than 50 percent of the total flow, and in which the industrial influent is compatible with treatment of normal domestic flow.

Questionnaire 1-2

To evaluate whether an EIS should be required, the State, with the aid of the grantee, should answer the following questions.

YES ____ NO ____ 1. Does the service area include and designated floodplains, wetlands, or wild and scenic rivers?

YES ____ NO ____ 2. Will the treatment facilities, interceptors, force mains or collectors be located in or adjacent to floodplains or wetlands?

YES ____ NO ____ 3. Will the proposed project result in the removal of any prime agricultural land from production?

YES ____ NO ____ 4. Will the project or the routing of interceptors, force mains or collectors result in the subsequent development of floodplains, wetlands or areas in agricultural production?

YES ____ NO ____ 5. Will the proposed project result in any adverse impact on critical resource areas identified in the State Coastal Zone Management Plan?

YES ____ NO ____ 6. Does the proposed service area contain any endangered or threatened species identified by the Fish and Wildlife Service?

YES ____ NO ____ 7. Will the proposed project result in discharges of pollutants that would preclude the use of surface waters or aquifers as present or future public water sup[illegible]s?

YES ____ NO ____ 8. Wi[illegible], archaeological or historic sites be affected by [illegible] project?

YES ____ NO ____ 9. Are any other impacts in terms of health and safety, air quality, odor, noise levels, land use trends, transportation and energy production or consumption, anticipated as a result of the proposed project?

A brief discussion must be provided for any "yes" response. This discussion must describe the potential impact and any mitigation measures that could be implemented to reduce the impact.

Since preparing an EIS requires analysis of several alternatives, it is not appropriate to use the generic plan which is intended to simplify the facilities planning process. If it can be determined that an EIS will be required, the grantee must develop a full facilities plan and an amended grant should be requested. If, however, this review fails to identify a need for an EIS, the grantee should proceed to develop a more detailed environmental review early in the facilities plan development.

Questionnaire 1-3

Can the effluent limitations set by the NPDES permit be achieved with the use of a stabilization pond or oxidation ditch? Listed below are effluent qualities that are obtainable from these technologies. If the limitations cannot be met with these technologies alone, either a land treatment option or a full facilities plan must be considered.

Stabilization Ponds

	In	Out	
BOD_5, mg/l	210	30	
COD, mg/l	400	100	
TSS, mg/l	230	60	
Total P, mg/l	11	8	
NH_3-N, mg/l	20	15	(cool climate)
		1	(warm climate)

Oxidation Ditches **

	Effluent (mg/l)			Removal, Percent		
	Winter	Summer	Annual Average	Winter	Summer	Annual Average
BOD	15.2	11.2	12.3	92	94	93
SS	13.6	9.3	10.5	93	94	94

Note: Oxidation ditches are capable of 95% to 99% nitrification and nitrogen removal when properly designed and operated.

** The average performance of 29 shallow oxidation ditch plants is summarized in the following: U.S. EPA, "A Comparison of Oxidation Ditch Plants to Completing Processes for Secondary and Advanced Treatment of Municipal Wastes," Report No. EPA 60012-78-051 (March 1978).

Questionnaire 1-4

Existing On-Site Systems

1. Are there any existing on-site systems within the planning area that are failing?

   ( ) yes — proceed to next question
   ( ) no — generic plan may be suitable

2. Are the causes of failure known?

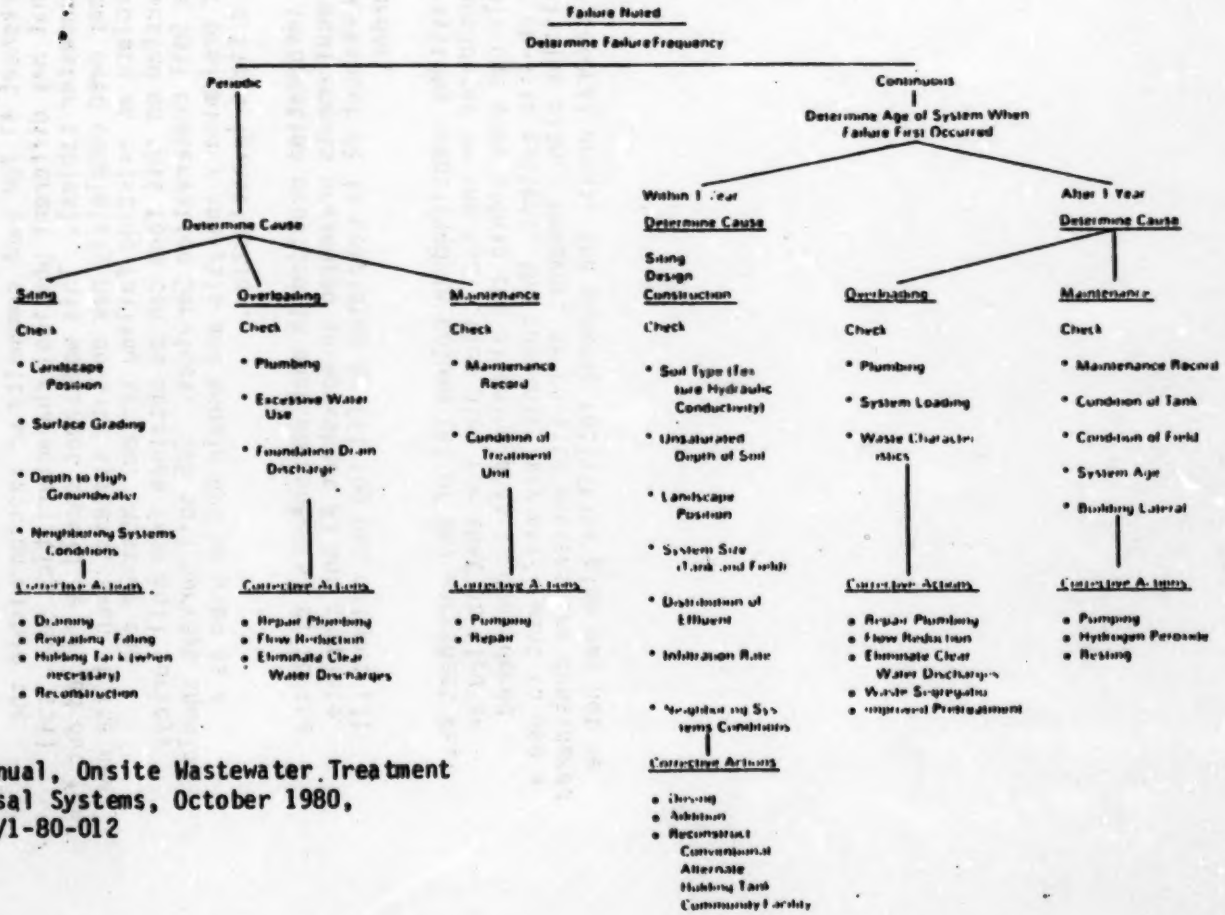
   ( ) yes — proceed to next question
   ( ) no — generic plan may not be suitable

3. Review the on-site system data requirements provided in Worksheet #3 of Questionnaire 1-5 and the list of corrective measures in Figure 2. Considering the lot sizes and other physical characteristics of existing development, could the existing systems be modified or rehabilitate the system?

   ( ) yes — generic plan may not be suitable and the use of a on-site management plan should be considered
   ( ) no — generic plan may be suitable

FIGURE 2

METHODS OF SOIL ABSORPTION FIELD REHABILITATION



Source: Design Manual, Onsite Wastewater Treatment and Disposal Systems, October 1980, EPA - 625/1-80-012

Questionnaire 1-5

New On-Site Systems

Instructions:-

1. Fill out worksheet #1 for each community or section within the planning area that has different physical characteristics (e.g. soil conditions, groundwater tables). This worksheet should be filled out for any areas that may need completely new on-site systems, even if the new systems would replace an existing failing system. Most of the information requested on this form can be obtained from soil surveys published by the Soil Conservation Services. SCS soil surveys should only be used for preliminary analysis and should not be used as a replacement for a field investigation.

2. Compare the information provided in each worksheet(s) #1 to the on-site system requirements presented in Worksheet #3 and complete worksheet #2. Worksheet #2 is completed by filling out columns (1) through (5) in order.

3. Any on-site systems identified in column (5) of any worksheet #2, should be considered in the facilities plan for that particular area. If only one area within the planning area is considered suitable for on-site systems, the community may still want to use a generic facilities plan. However, if on-site systems are considered suitable for several areas, the generic facilities plan may not be appropriate.

Community:

WORKSHEET # 1 FOR QUESTIONNAIRE 1-5

Lot Size:

Soil Condition:

Groundwater Table:

Evaporation Rate:

Rainfall:

Topography:

Depth to Bedrock:

WORKSHEET #2 FOR QUESTIONNAIRE 1-5

Community:

(1) Which on-site systems can be installed within the lot sizes?	(2) Which of the systems listed in column (1) can be installed given soil conditions? (include mound systems & evaporate systems, if in column (1)	(3) Which of the systems in column (2) can be operated within constraints of the groundwater table? (Include mound systems & evaporation systems, if in column (2)	(4) Which systems in column 3 can be operated within limits of bedrock depth?	(5) Which systems in (4) can be operated within limits of other considerations? (Such as topography, climate, etc.)

WORKSHEET #3 FOR QUESTIONNAIRE 1-5

Type of System	Minimum Lot Size	Soil Requirements	Climate Restrictions	Minimum Depth to Groundwater	Slope Restrictions	Depth to Bedrock
Septic Tanks						
- drainage field						
- mounds						
Evaporation Beds						
Evapotranspiration Systems						
Aerobic Units						
Other:						

Questionnaire 1-6

Cluster System Evaluation

Is there a small group of households located close together for which: a) connection to a centralized system may not be cost-effective because of distances or other physical barriers; or b) on-site systems may not be feasible or cost-effective?

If the response to this question is "yes", cluster systems should be evaluated for these households. If there are only one or two cluster systems that should be evaluated, the generic facilities plan may still be used. If, however, there are several cluster systems to be evaluated, a full facilities plan should be developed.

Questionnaire 1-7

Use of Existing Centralized Facilities

1. Are there existing centralized treatment facilities within or close to the planning area?

   ( ) yes proceed to next question.
   ( ) no generic facilities plan may be suitable.

2. Could these facilities, with possible modifications, be used to treat wastewater generated in all or part of the planning area? The following factors should be evaluated when evaluated when answering this question:

   Age of facilities
   Condition and capacity of existing facilities
   Plant expansion plan, if any
   Potential cost-effectiveness of using these facilities (consider distances and possible physical barriers such as topography)

   If the existing centralized facility consistently violates NPDES permit limitations and plant performance becomes a limiting factor in evaluating the alternative of using the existing facility, a Composite Correction Program (CCP) must be undertaken to identify the causes of poor plant performance. The problem areas to be addressed in this CCP evaluation include design, performance monitoring, operation, maintenance, and administration. The CCP evaluation procedure is presented in the Protocol for the Composite Correction Program which will be available in early 1981.

   ( ) yes proceed to next question.
   ( ) no generic facilities plan may be suitable.

3. Do these facilities involve the use of a stabilization pond or oxidation ditch?

   ( ) yes generic facilities plan may be suitable.
   ( ) no develop a full facilities plan.

SECTION 2

EFFLUENT LIMITATIONS

2.1 Permits - Attach a copy of the applicable NPDES and State (if any) permits. Summarize the effluent limitations (Table 2-1) contained in the permits or otherwise established by the State. Seasonal limitations or other variances should be highlighted. If the permit requires modification, then provide details.

2.2 Groundwater - Summarize any State and/or EPA groundwater discharge criteria and attach a copy (if applicable). See EPA groundwater discharge criteria set forth in the criteria for Best Practical Waste Treatment Technology (BPWTT).

SECTION 3

ENVIRONMENTAL INFORMATION DOCUMENT

3.1 Scoping and Incorporation by Reference - The grantee must provide an environmental information document (EID) for the State to use in preparing a preliminary environmental assessment. The State should use the preapplication screening process to determine the scope of the environmental analysis. When appropriate, information developed during the screening should be incorporated into the EID by citing a particular reference or document. Since duplication of information within the facilities plan should be avoided, the reader should be directed to any sections of the facilities plan that contain the information required in an EID.

3.2 Environmental Setting - The screening process performed by the State identified environmentally sensitive features within the planning area (e.g. wetlands, flood plains, recharge areas, plant life, wildlife, historic or archaeological sites, etc.). Provide a brief but adequate description of such features. When available, use standarized data sources provided by the State. Map overlays, reference studies and inventories prepared by local, State or Federal agencies may be used to describe sensitive environmental areas and the planning constraints related to such features. Where necessary, obtain letters from State or Federal representatives supporting the description of environmental features. Contact with the State Archaeologist or Historical Preservation Officer, Fish and Wildlife Service, etc., may be required.

3.3 Project Description, Purpose and Need - Briefly describe the proposed project (using a synopsis of the public information distributed per Section 8). Provide a brief discussion demonstrating the need for the proposed project, including a justification for any planned sewerage expansion. Refer the reader to appropriate portions of Section 2 (Effluent Limitations) and Section 4 (Current Situation) for discussions of service area characteristics and existing water quality needs.

3.4 Community Characteristics - Describe the physical and demographic characteristics of the planning area. Current maps showing the community's development patterns, land use and primary physical features can be used in place of narrative description. Tables and lists can be used to present the population data, as well as information on industries and major institutional installations in the service area. Historical population data should be based on census figures, while projected conditions must be consistent with the EPA approved State disaggregation of population forecasts prepared by the Bureau of Economic Analysis, Department of Commerce. Table 3-4 is the preferred format for presenting this information.

3.5 Alternatives - Refer the reader to Section 5.4 (No Action Alternative) and Section 6 (Alternatives) for a discussion of the alternatives considered during facilities planning.

3.6 Impacts of the Proposed Project on the Environment - Based on the initial appraisal of potential impacts conducted during the preapplication screening process and additional information developed during facilities planning, complete the questionnaire presented in Table 3-1. A brief discussion must be provided for any "yes" responses. Note any differences with the responses made during the initial appraisal. The narrative must evaluate both direct and indirect effects of the project on sensitive environmental areas. A summary of environmental impacts of treatment and collection alternatives may be provided in a format such as Table 3-2.

3.7 Mitigation of Environmental Impacts - Discuss any proposed mitigation measures that will minimize the environmental effects of the proposed project.

3.8 Summary of Agency and Public Consultation - For public consultation efforts the reader should be referred to Section 8 (Public Participation). If public agencies or environmental groups have been consulted during the development of the facilities plan, documentation should be provided in a format similar to Table 3-3.

SECTION 4

CURRENT SITUATION

4.1 Water Quality - Describe existing water quality conditions in the receiving stream(s) and groundwaters of the service area. A summary of the Water Quality Standards and a description of known violations of the standards should be provided, if not already provided in the discussion in Section 2. In cases where no data are available, general observations (e.g., fish kills, seasonal heavy loads, etc.) should be given. Descriptions of fisheries or recreational activities found in a given area can be useful indicators of background conditions.

4.2 Water Supply - An inventory of existing public water supplies in the service area and measures taken to assure protection of the community's water supply must be presented. The information presented should identify the location and source of water supplies, existing and potential capacity, type of construction, type of treatment, and future water supply plans.

4.3 Existing Wastewater Treatment Facilities - Tables, maps and brief narratives should be used to describe the existing sewerage system. The description must identify all system components, including the routing and sizing of collectors and interceptors, the location and capacity of pump stations, lift stations and forcemains, the layout and type of treatment plant process, the location of any outfall, and facilities and practices for the ultimate disposal of sludge or septic tank pumpings.

4.3.1 Operating Conditions - Describe the capacity of the existing system and operating conditions found at major pump stations and treatment plant(s). Include a statement on the number of people served by each system component. The performance of the existing system should be described using records on the frequency of power outages and mechanical breakdowns in the system, and the efficiency of the treatment plant during varying operating conditions (including the seasonal impact of industrial discharges on the treatment works). Performance data should be summarized in tables depicting past operating and monitoring results. A minimum of one year's past record is desirable.

4.3.2 Assessment of Potential Operational Changes - If secondary-type treatment facilities exist, the existing treatment works must be evaluated to identify any operational and maintenance improvements that would enable the plant to meet permit conditions. The Composite Correction Program (CCP) screening evaluation should be used to accomplish this. Based on the evaluation, the feasibility of upgrading the existing system to meet future needs should be determined. When appropriate, existing system components should be used in conjunction with a generic plan technology.

4.4 I/I Analysis - Extraneous infiltration/inflow water will usually have an insignificant effect on the level of treatment achieved by a lagoon. For oxidation ditches, the design of freeboard for secondary clarifiers may have to account for peak wet weather flows. State certification that I/I is not problem can be used in lieu of a full I/I analysis. If the State has not provided the certification, provide an analysis using the procedure outlined below.

4.4.1 I/I Procedure - Based on flow records at the treatment facility, water use records and the number of people served by the system, determine the maximum rate of infiltration and inflow using a 7-day average over a 12-month period (See notes to Table 5-1). If the I/I rate is less than 3,000 gallons/day/inch of pipe diameter/mile of sewer, the rate is considered nonexcessive. Up to 8,000 gidm may be justified on a case-by-case basis. The calculation of the system footage must include the service laterals.

If the above rate is exceeded, an analysis of the costs of reducing I/I versus the costs of transportation and treatment must be provided. Include an analysis of the impact on transport capacities. Identify the most cost-effective approach for removing extraneous water from the system. Identify all known system problem areas (pipe cave-ins, crushed pipe, by-pass points, inflow cross connections, groundwater conditions, etc.) and describe any remedial measures.

4.5 Existing On-Site Disposal Facilities - Describe those portions of the community currently served by septic tank/soil adsorption fields or other on-site systems. The location of existing facilities, the number of people served, the performance of the systems, and the method of septage disposal must be described through the use of maps, tables and brief narratives. Identify any soil or groundwater conditions that may impair the effectiveness of on-site treatment and disposal.

SECTION 5

FUTURE SITUATION

5.1 Wastewater Flow Projections - The present and projected wastewater flows of the service area over a 20-year period must be presented. The total demand is determined by summing each user class plus the contribution from infiltration/inflow. The analysis should define the wastewater service needs for all types of users (residential, institutional, commercial and industrial) within the service area by documenting the water use patterns exhibited by each class. (The notes to Table 5-1 present the maximum allowable water usage rates for undocumented situations.) Present hydraulic demand in the format provided in Table 5-1. Present the current and design organic and solids loadings at the treatment works as in Table 5-2.

5.1.1 Industrial - The compatibility, strength and volume of influent from industrial users must be evaluated for impacts upon the existing and future systems. The screening process limits the use of a generic plan to situations in which the industrial flow and loading is less than the domestic contribution, and in which industrial discharges are compatible with the treatment options provided. If an industry contributes more than 10 percent of the flows or loadings at the treatment works, a special letter of intent is required (see Table 5-2).

5.2 On-site Disposal - The continued use of on-site treatment is encouraged, provided that water supply and public health standards can be met. Identify areas where the population densities and soils are such that on-site treatment can be utilized. Site specific data on public water supply, densities, population presently served, topography/geology, and soil suitability must be developed for each on-site area. If density conditions are expected to change (to the extent that on-site disposal will be precluded), deferred (5, 10, 15 and 20 years) implementation of the generic plan should also be considered.

5.3 Service Areas for the Proposed Facility - Based on environmental constraints, projected growth and the suitability of using on-site disposal, define the service area for the proposed facilities. Describe those areas in which sewer service will not be provided.

5.4 Future Environment without the Project (No Action) - The future environmental conditions without the project must be analyzed in terms of water quality, public health and general environmental impacts. Use the analysis presented in Section 4.1 Water Quality and Section 4.2 Water Supply to project future conditions without the project. Copies of letters from State Health Department and Water Supply officials can be used as supporting information.

SECTION 6

ALTERNATIVES

6.1 Treatment Alternatives Eliminated from Consideration - Since the screening process for generic plans is designed to focus small community facilities planning on the most appropriate technology, the screening process itself provides the justification for eliminating non-generic alternatives from consideration. The grantee's consultant should review the decisions reached during the screening process to ensure that non-generic alternatives do not have substantial cost or other advantages.

6.2 Generic Plan Alternatives - Based on a consideration of effluent limitations, other State criteria and receiving stream water quality and flow characteristics, evaluate the design and operation of the generic plan options (see below). Consult Sections 2.0 and 4.1 for the seasonal flow and water quality characteristics of the receiving waters. The available discharge options (continuous, seasonal or no discharge), must be identified. If several discharge options are possible, the most cost-effective must be identified based on preliminary designs and cost comparisons. (CAPDET may be used for these cost comparisons.)

Stabilization Pond: The stabilization pond (aerobic, facultative, anaerobic) is the preferred generic plan option. At the beginning of facilities planning (or during the preapplication screening, if possible), the grantee's consultant should determine the appropriateness of a stabilization pond for the given community, taking into account factors such as water quality standards (a controlled discharge pond cambe considered as an option), the availability of suitable land, and prevailing land costs. If the use of a stabilization pond is considered appropriate, then siting and design work may proceed based upon accepted engineering practices and state standards for the design of stabilization ponds. (Table 6-1(a) presents an example of an evaluation format.)

Oxidation Ditch: If a community is unable to utilize the option of a stabilization pond, the next preferred option is a controlled discharge pond or the oxidation ditch technology. (Table 6-1(b) presents an example of an evaluation format for oxidation ditches.) In certain climatological or geographic areas, rotating biological contactors (RBCs) should also be considered. Engineering judgment based on local conditions and costs must be used in selecting the best technology.

The references included at the end of this document are recommended by EPA for providing design criteria for stabilization ponds and oxidation ditches. However, States may have their own specific criteria that must be followed; grantees and their consultants are

encouraged to discuss and agree upon the design criteria to be used with the State, and EPA if appropriate, before proceeding further.

6.3 Land Treatment - The evaluation of land treatment technologies is required in the construction grants regulations. In all cases where land treatment is not selected, the facilities plan must describe the reasons for rejecting that option. If land treatment is a viable option, the use of a generic plan must be discontinued and a full facilities plan prepared. Therefore, the land treatment option should be investigated as soon as possible by the grantee's consultant.

Most of the evaluation can be based on analysis performed by the State during the preapplication screening process. The evaluation provided in this section of the plan must cover the "first phase" items specified under "Specific Guidance" (IV B) in PRM 79-3 (Revision of Agency Guidance for the Evaluation of Land Treatment Alternatives Employing Surface Application). CAPDET may be used to assist in the preparation of cost estimates. Realistic cash value anticipated from crop sales should be included as a cost offset in the analysis for each year of operation. Under certain circumstances, the seasonal use of land treatment in combination with periodic surface water discharges should be considered.

6.4 Conveyance System - The analysis of the existing sewage collection and transmission system presented in Section 4.3 should have identified any need for repair, rehabilitation or replacement of the existing system. The analysis presented in Sections 5.2 and 5.3 identified areas where on-site treatment and disposal is appropriate and addressed the expansion of the collection system into presently unsewered areas. If a decision has been made that replacement or expansion of the collection system is required, the engineering evaluation must consider various alternative collection and transmission systems. In developing the cost-effectiveness analysis, the incentives for using innovative and alternative conveyance systems such as small diameter gravity pipe, pressure or vacuum sewers must be taken into account. Table 6-3 presents an example of the principal consideration needed for the analysis.

6.5 On-Site Disposal - The analysis presented in Sections 5.2 and 5.3 identified areas suitable for the continued use of individual or cluster on-site systems. The rehabilitation of systems in use before December 27, 1980 is grant-eligible and can qualify for an 85 percent grant for innovative and alternative technologies, if the community has an comprehensive on-site system management plan.

6.6 Cost-Effectiveness Summary - Using tables, present a summary of the costs of the proposed facilities. Use the format presented in Tables 6-1 and 6-2.

SECTION 7

PLAN SELECTION AND IMPLEMENTATION

7.1 Total Program Cost - Using tables and charts, present an analysis of the impact of the costs of the facilities on the community and individual users. Total program costs, the share provided by various funding sources, and user rates should be summarized. Distribute the summarized cost estimates throughout the community before the final public hearing to adopt the recommended plan. Table 7-1 provides an example of a format for presenting costs.

7.2 Schedule - Based on the community's position on the State priority list, discharge permit conditions and the level of commitment by the general public and their elected officials, an implementation schedule should be developed. The schedule should reflect specific actions required by local, State, and Federal officials. The need for any project phasing must be discussed.

7.3 Plan Adoption - An official action on the part of the implementing authority (usually by formal resolution) is needed. A copy of the adopting resolution should be included in the facilities plan to document support for the plan within the community. In multiple jurisdictional areas, each jurisdiction must adopt similar resolutions. Responsibility for implementing each program element must be clearly defined and formally supported by resolution from each party involved.

7.4 Preliminary Design - Prepare preliminary engineering designs for the recommended plan. Present design parameters for the facility in Table 7-2. The designs must consider site specific characteristics, conveyance system sizing and routing, the layout and sizing of the treatment process, and the layout of the final disposal system. The higher level of engineering detail will provide a basis for realistic capital and operation/maintenance cost estimates and therefore, establish a sound base for evaluating user costs. Include a summary of the operation and maintenance requirements for the treatment facility. From this preliminary engineering layout, prepare construction and O&M cost estimates.

SECTION 8

PUBLIC PARTICIPATION SUMMARY

8.1 Public Participation Work Plan - Outline the various activities that were identified in the public participation work plan. The basic requirements of a program designed for small communities using a generic facilities plan is presented in Table 8-1.

8.2 Public Meetings/Hearings - Briefly describe the meetings and hearings that were held during the planning process. Summarize the issues raised at such meetings and attach copies of the responsiveness summaries.

8.3 Public Information and Consultations - Briefly describe fact sheets, mailings, and media releases used during the planning process, including mechanisms for distributions such as postings in public buildings, public places (barber shops, groceries, etc.), spot news releases, etc.

TABLE 2-1

EFFLUENT LIMITATIONS

Pollutant	Effluent Limit (mg/l)
BOD_5	_____
SS	_____
NH_3 -N	_____
Phosphorus (P)	_____
Fecal Coliform	_____

TABLE 3-1

ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS

The following questionnaire should be used during the preapplication screening process and during the development of the facilities plan to identify sensitive environmental issues. "Yes" responses must be discussed in Section 3.6 of the plan. Any differences with the responses made at the preapplication conference should be noted and explained.

YES ____ NO ____ 1. Does the service area include any designated floodplains, wetlands, or wild and scenic rivers?

YES ____ NO ____ 2. Will the treatment facility, interceptors, force mains or collectors be located in or adjacent to floodplains or wetlands?

YES ____ NO ____ 3. Will the proposed project result in the removal of any prime agricultural land from production?

YES ____ NO ____ 4. Will the project or the routing of interceptors, force mains or collectors result in the subsequent development of floodplains, wetlands or areas in agricultural production?

YES ____ NO ____ 5. Will the proposed project result in any adverse impact on critical resource areas identified in the State Coastal Zone Management Plan?

YES ____ NO ____ 6. Does the proposed service area contain any endangered or threatened species identified by the Fish and Wildlife Service?

YES ____ NO ____ 7. Will the project result in discharges of pollutants that would preclude using surface waters or aquifers as public water supplies?

YES ____ NO ____ 8. Will any archaeological or historic sites be affected by the project?

YES ____ NO ____ 9. Are any other impacts in terms of air quality, odor, noise levels, land use trends, energy production or consumption, etc. anticipated as a result of the proposed project?

TABLE 3-2

SUMMARY OF
ENVIRONMENTAL IMPACTS OF TREATMENT/COLLECTION ALTERNATIVES

EXAMPLE

CATEGORY OF IMPACT	ALTERNATIVE 1				ALTERNATIVE 2				ALTERNATIVE 3			
	[illegible]	MINOR	MODERATE	SEVERE	[illegible]	MINOR	MODERATE	SEVERE	[illegible]	MINOR	MODERATE	SEVERE
Population Growth Rate		*			o				o			
Maintenance of Community Character			*			o				o		
Water Quality		+					+			+		
Groundwater Hydrology	etc.											
Agricultural/Open Space Preservation												
Wetlands/Flood Plains												
Historic/ Archaeological												
Air Quality												

* Adverse Impact
\+ Beneficial Impact
o No Impact

Note: Each alternative should be assessed in terms of expected impacts on the future environment without the project (i.e. no action alternative).

TABLE 3-3

DOCUMENTATION OF PUBLIC AGENCY CONSULTATION

	Attached
A. A-95 Clearinghouse Comments	_____
B. 208 Area Wide Water Quality Management Agency Comments	_____
C. State Historic Preservation Officer's Comments	_____
D. State (or professional) Archaeologist's Comments	_____
E. Fish and Wildlife Comments	_____
F. Section 404 and Section 10 Permits	_____
G. Other	_____

TABLE 3-4

POPULATION FIGURES

YEAR	POPULATION	DATA SOURCE
1950		U.S. Census
1960		" "
1970		" "
1980 (Estimated)		U.S. Census
1990 Projected		(BEA disaggregation)
2000 Projected		(BEA disaggregation)

TABLE 5-1
WASTEWATER FLOW PROJECTIONS

	Present	1990	2000
Population:			
Sewered Population (No. of Persons)			
Industrial Population Equivalent (PE)			
Industrial Area (acres)			
Design Population			
Base Flow:			
Residential Flow (mgd)			
Industrial Flow (mgd)			
Average Base Flow (mgd)			
Existing Average I/I (mgd)			
Design Flow (mgd)			
Peak Flow:			
Maximum Daily Residential Flow (mgd)			
Maximum Daily Industrial Flow (mgd)			
Maximum Daily Base Flow (mgd)			
Peak I/I (mgd)			
Total Daily Peak Flows (mgd)			

(see Notes to Table on next page)

NOTES TO TABLE 5-1

A. Total Average Daily = Q_{AB} + Average Infiltration/Inflow
(To be used for design of treatment facility hydraulic capacity)

Q_{AB} = Average Base Flow = Annual Average Daily Residential + Commercial Flow + Annual Average Daily Industrial Flow.

- Average Residential, Commercial and Institutional Use = 60-70 gpcd for populations less than 5000 (others use 65-80 gcpd) unless other flow figures are documented by local water use records.

- Industrial - for significant dischargers the flow must be documented; for minor dry industries a per acre contribution is needed; 1000 to 2000 gad are common.

Average Infiltration/Inflow - A calculated value based on annual flow as follows:

$$\frac{\text{Total Annual Flow - Total Annual } Q_{AB}}{\text{365 day/yr.}} = \text{GPD I/I}$$

OR

A system estimate based on an allowable I/I value of 500 gallons per day per inch diameter mile (gidm) for new sewer systems or an allowance of 3000 gidm for existing sewer systems.

B. Total Daily Peak = Q_{PB} + Peak Infiltration/Inflow
(To be used for design of hydraulic pumping and conveyance capacity)

Q_{PB} = Peak Base Flow = PF X Q_{AB}

- Peaking Factor - (Engineer's choice) a common factor is:
$PF = \frac{18 + \sqrt{p}}{4 + \sqrt{p}}$ where p = pop. in 1000.

Peak Infiltration/Inflow - A value calculated on the basis of peak wet weather observations. In many parts of the country the peak wet weather events reflect a value 2 or 3 times the average I/I rate. For existing sewer systems, a peak infiltration allowance of 8,000 gidm may be justified when determined on a case-by-case basis.

C. Grant eligible industrial flows are limited by conditions set forth in 40 CFR Part 35, Appendix A

TABLE 5-2
GENERAL PROJECT DESIGN INFORMATION

Current Population: _____ Design Year: _____

Design Population: _____ Source of Design Population: _____

A. Project Loadings:

Present	Industrial	Domestic & Commercial	I/I	Total
Hydraulic (Avg) (mgd)				
Hydraulic (Peak) (mgd)				
Organic (BOD_5/day)				
Sus. Solid (lbs/day)				
Other _____				
PE (basis _____)				

Design

Hydraulic (Avg) (mgd)				
Hydraulic (Peak) (mgd)				
Organic (BOD_5/day)				
Sus. Solid (lbs/day)				
Other _____				
PE (basis _____)				

B. List Industrial Contributors:

Name of Industry	Flow gpd	BOD lb/day	SS lb/day	Flow gpd	BOD lb/day	SS lb/day
_____	___	___	___	___	___	___
_____	___	___	___	___	___	___
_____	___	___	___	___	___	___
_____	___	___	___	___	___	___

Is letter of intent required from any of the above industrial contributors?

Yes _____ No _____ Attached

C. Basis of design flows and loadings: _____

_____

_____

D. Any project components 100% industrial? _____ No _____ Yes (Attach description)

(SEE NOTES ON FOLLOWING PAGE)

NOTES FOR TABLE 5-2

- Use the hydraulic demand developed in Table 5-1.
- The strength of the domestic and commercial wastewater should be based on local analysis. Samples taken in areas with no industrial contribution and during an extended dry weather period to minimize the impact of I/I are desirable. If this information is not available or obtainable, literature values can be used, i.e., BOD_5 of 150 to 250 mg/l and SS of 150 to 250 mg/l.
- Other design parameter that could be needed, i.e., NH_3, toxic substances (heavy metals, organic) would be documented similar to the organic solids loading criteria.
- Institutional contributions are addressed on a case-by-case basis.
- Industrial process wastewater contributions must be documented with site specific sampling and analysis. Account for seasonal variations.

TABLE 6-1(a)

STABILIZATION POND
EVALUATION FORMAT

A. Receiving Stream Controls:

(1) Base Flow (7/Q/10) Load Allocation - Wastewater Effluent Characteristics

(a) BOD_5 = _____ mg/l @ _____ MGD (Q present)
(b) BOD_5 = _____ mg/l @ _____ MGD (Q 20 yrs.)
(c) S.S. = _____ mg/l @ _____ MGD (Q present)
(d) S.S. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(e) D.O. = _____ mg/l @ _____ MGD (Q present)
(f) D.O. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(g) Others - as needed - NH_3, P, etc.

(2) Seasonal Sustained High[1], Load Allocation - Wastewater Effluent Characteristics

(a) BOD_5 = _____ mg/l @ _____ MGD (Q present)
(b) BOD_5 = _____ mg/l @ _____ MGD (Q 20 yrs.)
(c) S.S. = _____ mg/l @ _____ MGD (Q present)
(d) S.S = _____ mg/l @ _____ MGD (Q 20 yrs.)
(e) D.O. = _____ mg/l @ _____ MGD (Q present)
(f) D.O. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(f) D.O. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(g) Others - as needed - NH_3, P, etc.

(3) Stream Gauging Information Needed

(a) Agency responsible - U.S.G.S., State, Other _____.
(b) Location of gauge (Map) _____.
(c) Type of gauge _____.
(d) Years of record _____.
(e) Stage/Discharge Curves[1] _____.
(f) Flow Frequency Analysis[1] _____.

B. Process/Operation Selection:

(1) Based on load allocations at 7/Q/10 stream flow, can a continuous discharge be maintained? Yes _____ No _____

(2) Under the base condition, will an exemption on S.S. be required? Yes _____ No _____

[1]Based on site specific stage and frequency analysis; 94 percent yield assurance targeted.

TABLE 6-1(a) (Cont'd)

(3) Is a no discharge system feasible? Yes _____ No _____
present details.

(a) groundwater impacts
(b) evaporation/rainfall analysis
(c) allowable percolation rate used
(d) odors/nuisance controls
(e) land availability

(4) Based on load allocation for seasonal releases, define storage periods and corresponding volumes required.

(5) Process controls used - state all criteria used.

(a) number of cells
(b) flow sheet, parallel, series, combination
(c) surface BOD_5 loading rates ____lbs/ac/day
(d) minimum holding period per cell _____days
(e) depth of cells
(f) allowable percolation rate _____ in/day @ ___ feet of head
(g) seal coat, liner need? Yes _____ No _____
(h) recirculation capabilities
(i) overflow structure, fixed or variable height

C. Cost-Effectiveness Analysis: Present Worth and Average Annual Equivalent Cost

(1) Discount Rate - presently set @ 7-3/8 percent, verify at time of analysis
(2) Planning Period - 20 years
(3) Useful Life - See item 7 below
(4) Salvage Value - straight line depreciation, 20 yr./Useful Life
(5) Uniform Series Present Worth Factor - used to convert annual O&M cost to present worth. Example - factor @ 7-3/8%/20 years is 10.292. Reference MCD-53.
(6) Capital Recovery Factor - used to convert present worth values to average annual equivalent cost. Example - factor @ 7-3/8%/20 years is 0.09716. Reference MCD-53.

TABLE 6-1(a) (Cont'd)

(7) Cost Data Presentation Form

I - Construction Cost

Item	Const. Cost ($)	Useful Life (years)	Salvage Value ($)	Present Worth-SV ($)	Net-Present Worth ($)
Land		Permanent			
Pipes		50			
Structures - buildings, tanks		30-50			
Process Equip.		10-20			
Auxiliary Equip.		10-15			
Totals					

II - O&M Costs

Item	Annual Cost $/year	Present Worth
Labor		
Power		
Materials		
Administration		
Totals		

III - Average Annual Equivalent Costs

Construction Cost Net Present Worth _____

O&M Present Worth _____

Total Present Worth = _____

Total Net Present Worth X CRF = _____ Average Annual Equivalent Cost

TABLE 6-1(b)

OXIDATION DITCH
EVALUATION FORMAT

A. Receiving Stream Controls:

(1) Base Flow (7/Q/10) Load Allocation - Wastewater Effluent Characteristics

(a) BOD_5 = _____ mg/l @ _____ MGD (Q present)
(b) BOD_5 = _____ mg/l @ _____ MGD (Q 20 yrs.)
(c) S.S. = _____ mg/l @ _____ MGD (Q present)
(d) S.S. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(e) D.O. = _____ mg/l @ _____ MGD (Q present)
(f) D.O. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(g) Others - as needed - NH_3, P, etc.

(2) Seasonal Sustained High[1], Load Allocation - Wastewater Effluent Characteristics

(a) BOD_5 = _____ mg/l @ _____ MGD (Q present)
(b) BOD_5 = _____ mg/l @ _____ MGD (Q 20 yrs.)
(c) S.S. = _____ mg/l @ _____ MGD (Q present)
(d) S.S = _____ mg/l @ _____ MGD (Q 20 yrs.)
(e) D.O. = _____ mg/l @ _____ MGD (Q present)
(f) D.O. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(f) D.O. = _____ mg/l @ _____ MGD (Q 20 yrs.)
(g) Others - as needed - NH_3, P, etc.

(3) Stream Gauging Information Needed

(a) Agency responsible - U.S.G.S., State, Other _____.
(b) Location of gauge (Map) _____.
(c) Type of gauge _____.
(d) Years of record _____.
(e) Stage/Discharge Curves[1] _____.
(f) Flow Frequency Analysis[1] _____.

B. Process/Operation Selection:

(1) Based upon waste load allocations at 7/Q/10 stream flow, can the treatment facility satisfy the effluent requirement?
Yes _____ or No _____

1 Based on site specific stage and frequency analysis; 94 percent yield assurance targeted.

TABLE 6-1(b) (Cont'd)

(2) Is a no discharge system feasible during periods when waste load allocation exceeds treatment facility capacity?
Yes _____ No _____ (Present details)

(3) Is a no discharge system feasible? Yes _____ No _____ present details.

(a) groundwater impacts
(b) evaporation/rainfall analysis
(c) allowable percolation rate used
(d) odors/nuisance controls
(e) land availability

(4) Based upon seasonal waste load allocations, define periods of time when utilization of land application facilities is required for maintenance of stream standards.

(5) Process controls used - state all criteria used and identify combination uses (seasonal allocations)

(a) detailed flow sheet outlining system configuration and combination of unit processes.
(b) preliminary facilities - define type, capacity (ADF and Peak Flow), and number. Normally only barscreen with possibility of inclusion of grit chamber dependent upon Infiltration/Inflow condition.
(c) organic loading to oxidation ditch (lbs. BOD_5/day per 1000 cu.ft.) and total volume of oxidation ditch (gallons).
(d) minimum depth, designed free-board, and cross-sectional shape.
(e) length/width ratio used for design.
(f) minimum design velocity under initial flows, design flows, and peak flows.
(g) materials of construction utilized for oxidation ditch.
(h) type and capacity of aeration equipment utilized for oxygen transfer (lbs. of oxygen transfered/lb. BOD_5 applied).
(i) design criteria (average and peak flows) for final sedimentation tank including surface overflow rate, weir loading rate, sidewater depth, retention time, and solids recirculation capability.
(j) return sludge pumping capacity (normally 100% of average daily design flow.
(k) location of influent introduction to oxidation ditch, effuent withdrawl from oxidation ditch, return sludge introduction to oxidation ditch, and by-passing pipe arrangement for partial treatment of flow with either oxidation ditch or final clarifier out of service.

TABLE 6-1(b) (Cont'd)

(l) disinfection facility retention time and chemical feed rate/capacity (minutes at peak flow and lbs./day chemical (feed).
(m) sludge holding facilities for storage of waste solids when drying and/or final disposal is not available (capacity and design basis).
(n) sludge drying capability (area for drying beds and capacity for mechanical equipment.
(o) ultimate disposal of waste solids consideration (volume anticipated frequency, and location or method).
(p) ancillary facilities including raw waste pumping, electrical systems, maintenance building, site work and yard piping, access roads, fencing, alarm systems, and miscellaneous items.

C. Cost-Effectiveness Analysis: Present Worth and Average Annual Equivalent Cost

(1) Discount Rate - presently set at 7-3/8 percent. Verify at time of analysis
(2) Planning Period - 20 years
(3) Useful Life - See item 7 below
(4) Salvage Value - straight line depreciation, 20 yr./Useful Life
(5) Uniform Series Present Worth Factor - used to convert annual O&M cost to present worth. Example - factor @ 7-3/8%/20 years is 10.292. Reference MCD-53.
(6) Capital Recovery Factor - used to convert present worth values to average annual equivalent cost. Example - factor @ 7-3/8%/20 years is 0.09716. Reference MCD-53.

TABLE 6-1(b) (Cont'd)

(7) Cost Data Presentation Form

I - Construction Cost

Item	Const. Cost ($)	Useful Life (years)	Salvage Value ($)	Present Worth-SV ($)	Net Present Worth ($)
Land		Permanent			
Pipes		50			
Structures - buildings, tanks		30-50			
Process Equip.		15-20			
Auxiliary Equip.		15-15			
Totals					

II - O&M Costs

Item	Annual Cost $/year	Present Worth
Labor		
Power		
Materials		
Administration		
Totals		

III - Average Annual Equivalent Costs

Construction Cost Net Present Worth _____

O&M Present Worth _____

Total Present Worth = _____

Total Net Present Worth X CRF = _____ Average Annual Equivalent Cost

TABLE 6-2(a)
CAPITAL COSTS ESTIMATE

STABILIZATION POND		INTERCEPTORS	
Earthwork	$_____	Interceptor	$_____
Fencing	$_____	Lift Station	$_____
Seeding	$_____	Force Main	$_____
Piping, valves & interconnecting struc.	$_____		
Access Road & Site Work	$_____		
Influent/Effluent Struc.	$_____		
Flow Measurement	$_____	Subtotal	$_____
Other	$_____	A/E Fees: Step 2	$_____
	$_____	Step 3	$_____
	$_____	Legal & Admin.	$_____
	$_____	Contingency	$_____
	$_____	Total	$_____
	$_____	COLLECTION SYSTEM	
Subtotal	$_____	Collection System	$_____
A/E Fees: Step 2	$_____	A/E Fees: Step 2	$_____
Step 3	$_____	Step 3	$_____
Legal & Admin.	$_____	Legal & Admin.	$_____
Contingency	$_____	Contingency	$_____
Subtotal	$_____	Total	$_____
Land	$_____		
Total	$_____		

TOTAL CAPITAL COST $_____

TABLE 6-2(b)
CAPITAL COSTS ESTIMATE

OXIDATION DITCH		INTERCEPTORS	
Raw Waste Pumping Station	$_____	Interceptor	$_____
Preliminary Treatment	$_____	Lift Station	$_____
Oxidation Ditch	$_____	Force Main	$_____
Final Clarifier	$_____		
Disinfection Facilities	$_____		
Return Sludge Facilities	$_____		
Sludge Holding Facilities	$_____	Subtotal	$_____
Sludge Dewatering Facilities	$_____	A/E Fees: Step 2	$_____
Ultimate Disposal Area	$_____	Step 3	$_____
Site Pumping and Valves	$_____	Legal & Admin.	$_____
Access Roads and Other Site Work	$_____	Contingency	$_____
Operations/Maintenance Building	$_____		
Instrumentation and Electrical	$_____	Total	$_____
Other	$_____		
	$_____	COLLECTION SYSTEM	
	$_____	Collection System	$_____
Subtotal	$_____	A/E Fees: Step 2	$_____
A/E Fees: Step 2	$_____	Step 3	$_____
Step 3	$_____	Legal & Admin.	$_____
Legal & Admin.	$_____	Contingency	
Contingency	$_____	Total	$_____
Subtotal	$_____		
Land	$_____		
Total	$_____		

TOTAL CAPITAL COST $_____

TABLE 6-3

CONVEYANCE SYSTEMS
EVALUATION FORMAT

A. Design Criteria:

(1) Base Conditions

(a) Average depth to rock _____ feet.
(b) Average depth to groundwater _____ feet.
(c) Topography - use U.S.G.S. quad sheets.
(d) Distance to existing system _____ feet, use location map(s).
(e) User density (present and projected) - Ref. Section 3.4

Future Situation, allocation of population, commercial and industrial to each service zone in the service area.

(2) Equipment Selection

(a) Effluent pump design - normally considered much more reliable than the grinder pump installation. Soils, geology and groundwater elevations may make septic tank installation impractical.

(b) Grinder pump design - provides greater internal plumbing flexibility but is more prone to breakdown/stopage.

(c) Pressure mainfold versus gravity design - normally pump discharge to a small diameter gravity system is preferred from an energy and reliability viewpoint to a pressure manifold system. Site and area conditions will dictate best situation.

B. Design Analysis:

(1) For each Alternative Configuration provide -

(a) Layout of the system showing house service (effluent or grinder) arrangement, size and routing of piping and pump station location and capacity.

(b) Hydraulic analysis of each alternative considered.

(c) Cost-Effectiveness Analysis:

Same cost breakdown as shown in Table 5-2. Use realistic useful lifes of equipment and realistic maintenance requirements.

TABLE 7-1

COST IMPACT ANALYSIS

Total Capital Cost	$_____		
Funding Sources	Federal Grants:		
	EPA	$_____	
	FmHA	$_____	
	EDA	$_____	
	Others	$_____	
	State Grants:	$_____	
	TOTAL	$_____	
Local Share[1]	(a)	$_____	
	(b)	$_____	
	(c)	$_____	
Financing Cost[2]	(a)	$_____	
	(b)	$_____	
	(c)	$_____	
Funding Sources	Federal Loans	$_____	
	Revenue Bonds	$_____	
	Ad valorem	$_____	
	Taxes	$_____	
	Other	$_____	
O & M Cost		$_____/yr.	
Typical User Rates[3]	(a)		$_____
	(b)		$_____
	(c)		$_____

[1](a), (b), (c), etc. - Provide variable estimates based on a range from no external assistance to maximum realistic funding available.

[2](a), (b), (c), etc. - Variable, as needed to support a range of funding possibilities. The cost reflected is the debt service charge estimated under current market and/or outside assistance available.

[3](a), (b), (c), etc. - Typical user rates (per household per month) anticipated under varying financial support.

TABLE 7-2 (a)

STABILIZATION POND DESIGN PARAMETERS

Parameter	
Average daily flows, mgd	_____
Number of cells, in parallel or in series	_____
Detention Time, Days	
Cell # 1	_____
Cell # 2	_____
Cell # 3	_____
Depth, ft	
Cell # 1	_____
Cell # 2	_____
Cell # 3	_____
BOD Loading Rate, LB/Acre/Day	
Cell # 1	_____
Cell # 2	_____
Cell # 3	_____
Influent SS/BOD concentration, mg/l	____/____
Effluent SS/BOD concentration, mg/l	____/____
Surface area of ponds, acres	
Cell # 1	_____
Cell # 2	_____
Cell # 3	_____
Lining, if any (specify type)	_____
Overflow structure, fixed or variable heights	_____

TABLE 7-2 (b)

OXIDATION DITCH DESIGN PARAMETERS

Average daily flows, mgd	_____
Hydraulic retention time, hours	_____
Minimum depth, ft Liquid depth	_____
Freeboard (allow for peak wet weather flows)	_____
BOD Loading Rate, lb/day/1000 cu. ft.	_____
Influent SS/BOD concentration, mg/l	____/____
Effluent SS/BOD concentration, mg/l	____/____
Minimum design velocity, fps	_____
Initial Flow	_____
Design FLow	_____
Peak Flow	_____
Total Volume of Oxidation Ditch, gallons	_____
Cross-section area of channel	_____
Cross-sectional channel shape	_____
Length/width ratio	_____
Materials of construction	_____
Type of aeration equipment	_____
Capacity of aeration equipment, lbs of O transfered	_____
Return sludge pumping capacity, mgd	_____
Final clarifier overflow rate, gpd/sq. ft.	_____

TABLE 8-1

PUBLIC PARTICIPATION

Work Element	Remarks
Work Plan	Outline program activities and the schedule of events during the planning process. Describe how the community will be kept informed of the facilities planning program. Include the name and number of a public participation contact person. One Page.
Fact Sheet	Define the objectives of the facilities planning and the scope, costs and results required. - one page.
Develop Mailing List	Seek a broad-base representation in developing the mailing list.
Distribute Work Plan and Fact Sheet	In addition to the mailing list, display this information in public buildings, (e.g., Town Halls, Libraries, etc.). Spot news releases in the local newspapers and radio are encouraged.
Town Council Meeting (Kick-off Session)	Early in the planning process, a public consultation must be held to inform the public of proposed facilities planning options and to identify potential community issues that should be addressed. A town council meeting can be used as a "kick-off" session to discuss the need for a project, existing problem areas, possible solutions identified in the screening process, and the proposed schedule for completing the plan. The meeting must be documented with a brief summary of the proceedings. Community priorities and issues identified as a result of that meeting should be incorporated in this section of the facilities plan. The proceedings should be documented with a brief summary of meeting.

Town Council Meeting (General Findings)	During the alternative analysis phase of the facilities planning, public involvement should be aimed at discussing the options considered and establish the acceptability of specific alternatives. A public meeting is required at the completion of alternative analysis. Discuss the basic findings of the facilities plan without recommendations. A responsiveness summary addressing issues raised at the meeting must be provided following the public meeting.
Public Hearing	Based on the technical evaluation of alternatives and public input obtained at previous meetings and hearings, a recommended plan must be selected and presented to the community's elected officials for formal adoption. If more than one unit of local government is required to implement the plan, each entity must approve the plan through a formal resolution of acceptance. A summary description of the project, the projected schedule for implementation and a listing of costs to users must be distributed throughout the community before the hearing. A record and summary of the hearing is required.

REFERENCES

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U.S. Environmental Protection Agency, Upgrading Lagoons, EPA-625/4-73-001a (August 1973), Technology Transfer Seminar Publication

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